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SEARCH REQUEST FORM **Scientific and Technical Information Center - EIC2800**

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Date 3/20/03 Serial # 10/039,199 Priority Application Date 1/20/02

Your Name CHI-SING LOUIE Examiner # 77474

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In what format would you like your results? Paper is the default. PAPER DISK EMAIL

If submitting more than one search, please prioritize in order of need.

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03-20-03 P04:20 IN

Where have you searched so far on this case?

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Other: IEEE

What relevant art have you found so far? Please attach pertinent citations or Information Disclosure Statements.

What types of references would you like? Please checkmark:

Primary Refs ___ Nonpatent Literature ___ Other ___

Secondary Refs ___ Foreign Patents ___

Teaching Refs ___

What is the topic, such as the **novelty**, motivation, utility, or other specific facets defining the desired **focus** of this search? Please include the concepts, synonyms, keywords, acronyms, registry numbers, definitions, structures, strategies, and anything else that helps to describe the topic. Please attach a copy of the abstract and pertinent claims.

A buffer layer is formed by epitaxially grow a metal film (i.e. In, Ga, B, Al etc metal) and epitaxially grow a metal nitride film (i.e. InN, GaN, BN, AlN). The nitride in the metal nitride layer reacts with the pure metal and form a metal nitride buffer layer.

Look for nitrification, nitrified process.

Staff Use Only

Searcher: Derrick Blalock

Searcher Phone: ___

Searcher Location: STIC-EIC2800, CP4-9C18

Date Searcher Picked Up: 3/21/03

Date Completed: 3/24/03

Searcher Prep/Rev Time: ___

Online Time: ___

Type of Search

Structure (#) ___

Bibliographic ✓

Litigation ___

Fulltext ___

Patent Family ___

Other ___

Vendors

STN ✓

Dialog ✓

Questel/Orbit ___

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WWW/Internet ___

Other ___

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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2002/0197825 A1

Usui et al. (43) Pub. Date: Dec. 26, 2002

(54) SEMICONDUCTOR SUBSTRATE MADE OF GROUP III NITRIDE, AND PROCESS FOR MANUFACTURE THEREOF

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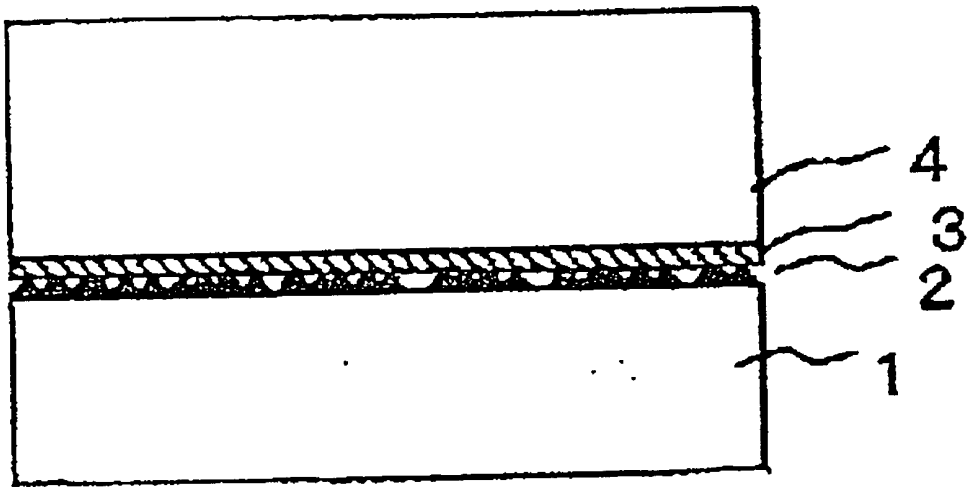
(52) **U.S. Cl.** **438/459**; 438/458; 438/604; 257/189

(57) **ABSTRACT**

To provide a semiconductor substrate of a group III nitride with low defect density and little warp, this invention provides a process comprising such steps of:

forming a GaN layer **2** on a sapphire substrate **1** of the C face ((0001) face); forming a titanium film **3** thereon; heat-treating the substrate in an atmosphere containing hydrogen gas or a gas of a compound containing hydrogen to form voids in the GaN layer **2**; and thereafter forming a GaN layer **4** on the GaN layer **2'**.



10/038,199

FILE 'REGISTRY'

L1 33 S (IN AND N)/ELS AND 2/ELC.SUB
L2 46 S (GA AND N)/ELS AND 2/ELC.SUB
L3 227 S (B AND N)/ELS AND 2/ELC.SUB
L4 204 S (AL AND N)/ELS AND 2/ELC.SUB
L5 0 S IN/CN
L6 0 S INIDIUM/CN
L7 1 S INDIUM/CN
L8 1 S GALLIUM/CN
L9 1 S BORON/CN
L10 1 S ALUMINIUM/CN

FILE 'HCAPLUS'

L11 5847 S (INDIUM OR IN)(W)(NITRIDE OR N)
L12 20095 S (GALLIUM OR GA)(W)(NITRIDE OR N)
L13 24575 S (BORON OR B)(W)(NITRIDE OR N)
L14 23872 S (ALUMINUM OR AL OR ALUMINIUM)(W)(NITRIDE OR N)
L15 157167 S INDIUM
L16 1542518 S GALLIUM OR GA
L17 187167 S BORON
L18 1230738 S ALUMINUM OR AL OR ALUMINIUM
L19 51943 S (L1 OR L2 OR L3 OR L4)
L20 403401 S (L7 OR L8 OR L9 OR L10)
L21 6625 S L19 AND L20
L22 117 S L21 AND EPITAX?(W)GROW?
L23 17 S L22 AND (BUFFER)(W)(LAYER? OR FILM OR COAT?)
L24 191 S L21 AND (BUFFER)(W)(LAYER? OR FILM OR COAT?)
L25 6 S L24 AND (METAL?)(W)(LAYER? OR FILM OR COAT?)
L26 1 S L22 AND (METAL?)(W)(LAYER? OR FILM OR COAT?)
L27 271 S L21 AND (METAL?)(W)(LAYER? OR FILM OR COAT?)
L28 271 S (L24 OR L27) AND METAL?(W)(LAYER? OR FILM OR COAT?)
L29 6 S L24 AND METAL?(W)(LAYER? OR FILM OR COAT?)
L30 1 S L22 AND METAL?(W)(LAYER? OR FILM OR COAT?)
L31 271 S L21 AND METAL?(W)(LAYER? OR FILM OR COAT?)
L32 7 S L31 AND BUFFER
L33 18 S L22 AND BUFFER

L34 191 S L24 AND BUFFER
L35 3 S L24 AND METAL(W)(NITRIDE OR N)
L36 2 S L22 AND METAL(W)(NITRIDE OR N)
L37 15 S L27 AND METAL(W)(NITRIDE OR N)
L38 60335 S ((L11 OR L12 OR L13 OR L14)) AND ((L15 OR L16 OR L17 OR L18))
L39 1615 S L38 AND EPITAX?(W)GROW?
L40 11 S L39 AND METAL(W)(NITRIDE OR N)
L41 250 S L39 AND (BUFFER)(W)(LAYER? OR FILM OR COAT?)
L42 99 S L41 AND METAL?
L43 20 S L41 AND METAL
L44 67 S L23 OR L25 OR L26 OR L29 OR L30 OR L32 OR L33 OR L35 OR L36 OR L37 OR L40 OR L43
L45 67 DUP REMOVE L44 (0 DUPLICATES REMOVED)
SEL PN
L46 43 S (EP865088/PN OR FR2571548/PN OR GB2354370/PN OR WO2002054468/PN OR AU2001094534/PN OR CN1197998/PN OR CN1281247/PN OR CN1289866/PN OR CN1316783/PN OR DE10006108/PN OR DE19613265/PN OR EP1039555/PN OR EP1137077/PN OR EP1271626/PN OR EP800214/PN OR JP03202468/PN OR JP04052263/PN OR "JP050866 46 B4"/PN OR JP07312350/PN OR JP08124789/PN OR JP10041230/PN OR JP10075008/PN OR JP10316498/PN OR JP11046045/PN OR JP1133051 9/PN OR JP2000261032/PN OR JP2001068414/PN OR JP2001085670/PN OR JP2001111109/PN OR JP2001302398/PN OR JP2001338886/PN OR JP2002154900/PN OR JP2002170991/PN OR "JP2844779 B2"/PN OR "JP3257344 B2"/PN OR JP50079500/PN OR JP60173829/PN OR RU2097452/PN OR TW465128/PN OR TW475208/PN OR US2001053600/PN OR US2002028343/PN OR US2002056840/PN OR US2002064941/PN OR US2002069592/PN OR US2002084461/PN OR US2002149023/PN OR US2002158258/PN OR US2002187631/PN OR US2003019423/PN OR US2003020104/PN OR US2003042505/PN OR US5675028/PN OR US6270587 /PN OR US6320213/PN OR US6372636/PN OR US6380050/PN OR US6387722/PN OR US6391748/PN OR US6462357/PN OR US6465888/PN OR US6492191/PN OR US6504183/PN OR WO2002029873/PN OR WO2002040 599/PN OR WO2002040600/PN OR WO2002067319/PN OR WO2003012841/PN OR WO9731140/PN)

FILE 'DPCI'
L47 0 S US20020197825/PN.G,PN.D

FILE 'WPIX, JAPIO'

L48	57 S	L46
L49	4255 S	(INDIUM OR IN)(W)(NITRIDE OR N)
L50	3509 S	(GALLIUM OR GA)(W)(NITRIDE OR N)
L51	17485 S	(BORON OR B)(W)(NITRIDE OR N)
L52	12257 S	(ALUMINUM OR AL OR ALUMINIUM)(W)(NITRIDE OR N)
L53	25647 S	INDIUM
L54	1172436 S	GALLIUM OR GA
L55	70900 S	BORON
L56	531909 S	ALUMINUM OR AL OR ALUMINIUM
L57	21816 S	EPITAX?(W) GROW?
L58	13825 S	(BUFFER)(W)(LAYER? OR FILM OR COAT?)
L59	106846 S	(METAL?)(W)(LAYER? OR FILM OR COAT?)
L60	28495 S	((L49 OR L50 OR L51 OR L52)) AND ((L53 OR L54 OR L55 OR L56))
L61	325 S	L60 AND L57
L62	40 S	L61 AND L58
L63	10 S	L61 AND L59
L64	317 S	(L61 OR L63) NOT L48
L65	317 S	(L61 OR L62) NOT L48
L66	317 S	L61 NOT L48
L67	317 S	L61 NOT L48
L68	46 S	(L63 OR L62) NOT L48